

FEE TRANSMITTAL

Application Number NOT YET ASSIGNED
Filing Date June 4, 1998
First Named Inventor Lawrence L. Staples
Attorney Docket Number AIN 1732


METHOD OF PAYMENT

1. ☐ The Commissioner is hereby authorized to charge the indicated fees to Deposit Account No. 19-1345, in the name of Senniger, Powers, Leavitt & Roedel.
- ☐ The Commissioner is hereby authorized to charge any additional filing and claim fees under 37 CFR 1.16 and application processing fees under 37 CFR 1.17 to Deposit Account No. 19-1345, in the name of Senniger, Powers, Leavitt & Roedel.
2. ☒ Check Enclosed. The Commissioner is hereby authorized to charge any under payment or credit any over payment to Deposit Account No. 19-1345, in the name of Senniger, Powers, Leavitt & Roedel.

FEE CALCULATION

1. ☒ BASIC FILING FEE \$395.00 (Type: Formal Utility)
Entity Status: small
2. ☐ CLAIM FEE \$ --
- Total Claims 9
Independent Claims 2
Multiple Dependent Claims --
3. ☒ ADDITIONAL FEES \$40.00
- ☐ Surcharge - late filing fee or oath
☐ Surcharge - late provisional filing fee or cover sheet
☐ Extension for reply within _____ month
☐ Notice of Appeal
☐ Filing a Brief in Support of an appeal
☐ Request for Reexamination
☐ Petitions to the Commissioner
☐ Submission of Information Disclosure Statement
☒ Recording each patent assignment per property
☐ Other: _____

TOTAL AMOUNT OF PAYMENT \$435.00


Paul I. J. Fleischut, Reg. No. 35,513

June 4, 1998
Date

PIF/leb

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PATENTS, TRADEMARKS, COPYRIGHTS
AND RELATED MATTERS

June 4, 1998

UTILITY PATENT APPLICATION TRANSMITTAL
(new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket Number: AIN 1732
First Named Inventor: Lawrence L. Staples
Express Mail Label Number: EM048946169
Total Pages: 9

TO: Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

APPLICATION ELEMENTS

1. ☒ Fee Transmittal Form
(original and duplicate)
2. ☒ Specification [Total Pages 6]
3. ☒ Drawings [Total Sheets 2]
4. Oath or Declaration [Total Pages 3]
 - a. ☒ Newly executed (original or copy)
☐ New (unexecuted)
 - b. ☐ Copy from a prior application
(for continuation/divisional with
Box 17 completed)
 - i. ☐ DELETION OF INVENTOR(s)
Signed statement attached
deleting inventor(s) named
in prior application.
5. ☐ Incorporation By Reference
(useable if Box 4b is marked)
The entire disclosure of the prior application, from
which a copy of the oath or declaration is supplied
under Box 4b, is considered as being part of the
disclosure of the accompanying application and is hereby
incorporated by reference therein.

6. ☐ Microfiche Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above
copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ IDS with PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard
14. ☒ Small Entity Statement(s)
☐ Statement filed in prior application; status still
proper and desired
15. ☐ Certified Copy of Priority Document(s) if foreign
priority is claimed
16. ☐ Other: _____

**IF A CONTINUING APPLICATION, CHECK APPROPRIATE
BOX AND SUPPLY THE REQUISITE INFORMATION**

17. ☐ Continuation ☐ Divisional ☐ Continuation-in-Part
of prior application No.: ____/____
- ☒ Complete Application
based on provisional Application No. 60/048,548

CORRESPONDENCE ADDRESS

18. Correspondence Address: Customer Number 000321
Attention: Paul I. J. Fleischut

Respectfully submitted,


Paul I. J. Fleischut
Reg. No. 35,513

PIF/leb

AIR INFILTRATION PREVENTION IN BUILDINGS**BACKGROUND OF THE INVENTION**

This invention is directed to a method for reducing infiltration of air into a residence or other building, which reduction in air infiltration results in a reduction in heating and cooling requirements.

In insulating a building it has been the prior practice to reduce the infiltration of air into and within the building by applying caulk to fill some gaps between boards, voids and other locations where air would otherwise have an opportunity to seep into the building and from one location in the building to another location. For example, between two components of a double stud supporting a window header, there is typically a small gap in places where the two surfaces do not lay completely flat against each other. It has been the practice to apply a strip of caulk along such seams in order to fill in any gaps where air would tend to have an opportunity to flow. A disadvantage of this approach has been that this filling in of gaps provides is incomplete and, particularly over time as the abutting pieces move relative to each other, further gaps are formed which allow air to nonetheless flow between the abutting components. Caulk does not expand and contract sufficiently to keep such gaps sealed through seasonal cycles.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved method for reducing air infiltration in a building.

Briefly, therefore, the invention is directed to a method for reducing air infiltration in a building having a frame comprising wooden components, the method comprising applying glue to abutting wooden surfaces to

provide a seal between such surfaces to prevent air flow between such surfaces.

Other objects and features of the invention will be in part apparent and in part pointed out hereinafter.

5 BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 is a perspective view of a wall panel system treated in accordance with the method of the invention.

Fig. 2 is a schematic view of a joint treated in accordance with the method of the invention.

10 DETAILED DESCRIPTION OF THE INVENTION

One aspect of this invention involves installation into a building, during construction, of an energy packaging in which various abutting surfaces in the building are glued to each other. This is in contrast to applying a substance such as caulk essentially only fills in gaps between abutting surfaces, but does not bind and seal the gaps like glue does. By gluing such surfaces together, an actual seal is created between the surfaces which more completely blocks the flow of air between such surfaces. Furthermore, by gluing such surfaces together, longer lasting air infiltration is imparted to such surfaces which withstands minor movement of such surfaces relative to each other, and normal expanding and contracting through the seasons and through the years.

25 The invention involves applying glue to bind wooden components known as double plates together in a building as shown in Fig. 1, to block air infiltration between the two plates. The glue is applied once the frame and exterior sheeting of the building is in place, but prior to installation of fiber insulation. Glue is applied
30 between double studs which support, for example, window and door headers to bind the two studs together and prevent air infiltration between them. Glue is applied

where surfaces of wooden components abut at corners of wall frames at, for example, a 90° angle as shown in Fig. 1 and other corners. Glue is applied at abutting surfaces at subfloors and where subfloors meet exterior wall plates. Glue is applied where floor joists abut other surfaces, as shown in Fig. 2. Glue is applied where bandboards surfaces abut other surfaces. Glue is applied at most surfaces where two-by-fours and other wooden components abut each other and other surfaces. Optionally, glue is applied to joints in air ducts. The effect of the foregoing is to form a permanent seal between all of the aforementioned surfaces which seal blocks the flow of air between such surfaces. It is preferred that a seal is created at the majority of the above-described abutting surfaces, more preferred that a seal is created at 85% of the above-described abutting surfaces, most preferably that a seal is created at all of the above-described abutting surfaces within the building. This reference to, for example, "majority of," "85% of," and "all of the above-described surfaces" is intended to convey that where, for example, two 2-by-4s lay on top of each other, glue is applied to "all" of the abutting length. This is not intended to convey that "all" of the abutting surface area is sealed. To seal the entirety of the abutting surfaces of two 2-by-4s, it is necessary to apply glue to the entire length of contact, but not to the entire flat contacting surfaces of the respective boards. The same concept applies to the reference to "majority" and "85%" in this sentence. What is critical is to create a seal at the majority of, 85% of, or all of, the abutting surfaces, to seal the majority of, 85% of, or all of the gaps between such surfaces, which does not require application of glue to the entirety of such surfaces.

In carrying out the gluing of surfaces together, the glue preferably is a hydrocarbon-based adhesive containing petroleum distillates, more preferably an aromatic hydrocarbon-based adhesive, still more preferably a benzene derivative based adhesive, most preferably a naphthalene- and benzene-based adhesive. One preferred glue is commercially available from Glidden Company under the trade name "Liquid Nails." This glue contains petroleum distillates, polymers with petroleum naphtha, benzene, 1,3,-diethenyl-, polymer with 1,3-butadiene and ethenylbenzene, carbonic acid, calcium salt, kaolin, solvent naphtha, light aliphatic, quartz, 3-methylpentane, 2,2-dimethylbutane, 2,3-dimethylbutane, and 2-methylpentane. The preferred glue has elastomeric properties which allow it to expand and contract as the wooden components expand and contract.

Because this glue, as contrasted with caulk, has the ability to expand and contract as abutting surfaces expand and contract, the integrity of the seal between abutting surfaces is not compromised as the building undergoes normal expansion and contraction due to changes in temperature. Sealing a house by this method has been determined to reduce air infiltration by about half.

In another embodiment of the invention, the foregoing sealing operation is carried out in combination with application of insulating material around windows and doors, behind electric boxes at exterior walls, and at wire and pipe holes at exterior walls and interior attic walls. The preferred material for this optional operation is that which is commercially available from Owens Corning under the trade designation "Pink Seal."

In accordance with this invention it is preferred to reduce air infiltration to less than about 0.7 air changes per hour, preferably to less than about 0.5 air changes per hour.

A second optional aspect of this invention involves testing for air infiltration after a first phase of sealing and further sealing with glue where air infiltration is determined not to have been prevented. During construction of a home, this energy package is installed and the home is tested for air infiltration prior to installation of fiberglass insulation. Testing involves temporary installation of a blower door into an exterior doorway in the home. This blower door essentially pulls a vacuum on the house to detect and quantify leaks. One then examines the house throughout with a smoke stick while the blower is in operation in order to detect any significant leaks, representing air infiltration, and then seals such leaks using glue. In many instances this operation is not performed because there is sufficient confidence in the first sealing operation.

A third aspect of this invention involves a link among an insulation installer, a lending institution, and new home purchaser, which link is essentially a method of increasing the potential size of the purchaser's home. Lending institutions are prepared to lend a greater amount of money to the purchaser of a home having the above-noted air infiltration package because the purchaser's utility bills will be reduced by, for example, 20% over the life of the home. The purchaser is therefore able to purchase a larger home.

EXAMPLE

Three homes under construction were sealed in accordance with the method of the invention after all of the trusses, floors, and exterior wall panels were in place. In particular, glue available under the trade designation "Liquid Nails" was applied between the following abutting surfaces: double plates, double

studs, studs and headers, corner surfaces of wall frames, subfloors and exterior wall plates, bandboard surfaces and subfloors, bandboards and plates, and two-by-fours. A high density ceiling insulation package was installed in each of the three homes. A fourth home under construction was prepared with a standard R-38 ceiling insulation package without application of glue between abutting surfaces to serve as a control home for comparison.

A blower door was installed in a door to each of the four homes. Upon operation of the blower door, the control home was determined to undergo 0.95 air changes per hour. The three homes prepared in accordance with the invention underwent 0.52, 0.24, and 0.62 air changes per hour, for an average of 0.46 air changes per hour. By comparison of 0.95 air changes to 0.46 air changes, it is evident that air infiltration was reduced by more than 50%.

As various changes could be made in the above embodiments without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

WHAT IS CLAIMED IS:

1. A method for reducing air infiltration in a building having a frame comprising wooden components, the method comprising applying glue to a majority of abutting surfaces of said wooden components to seal gaps between such surfaces to block air flow between such surfaces.

2. The method of claim 1 wherein the glue after application is capable of expanding and contracting with changes in temperature.

3. The method of claim 2 wherein the glue is a hydrocarbon-based adhesive containing petroleum distillates.

4. The method of claim 2 including applying glue to create a seal between abutting surfaces at subfloors and where subfloors meet exterior wall plates.

5. The method of claim 4 wherein glue is applied to at least about 85% of said abutting surfaces in the building.

6. The method of claim 1 comprising:
applying glue to create a seal between abutting surfaces of wooden components forming double plates of wall panels;

applying glue to create a seal between abutting surfaces of wooden components of double studs supporting window and door headers;

applying glue to create a seal between abutting surfaces of wooden wall panels forming corners; and

applying glue to create a seal between abutting surfaces at subfloors and where subfloors meet exterior wall plates.

7. The method of claim 1 comprising, in sequence:

a) applying glue to create a seal between wooden components forming double plates, between wooden components of double studs supporting window and door headers, between abutting surfaces of wooden wall panels forming corners, between abutting surfaces at subfloors and where subfloors meet exterior wall plates;

b) drawing air into the building and locating gaps between abutting surfaces; and

c) applying glue to seal gaps located in step (b).

8. A method for reducing air infiltration to less than about 0.7 air changes per hour in a residence having a frame comprising wooden components, the method comprising applying glue to abutting wooden surfaces to provide a seal between such surfaces to block air flow between such surfaces and reduce air infiltration to less than about 0.7 air changes per hour.

9. The method of claim 8 comprising applying glue to abutting wooden surfaces to provide a seal between such surfaces to block air flow between such surfaces and reduce air infiltration to less than about 0.5 air changes per hour.

AIR INFILTRATION PREVENTION IN BUILDINGS**ABSTRACT**

5 A method for reducing air infiltration in a building having a frame comprising wooden components. Glue is applied to abutting wooden surfaces to provide a seal between such surfaces to prevent air flow between such surfaces.

1/2

Fig 1

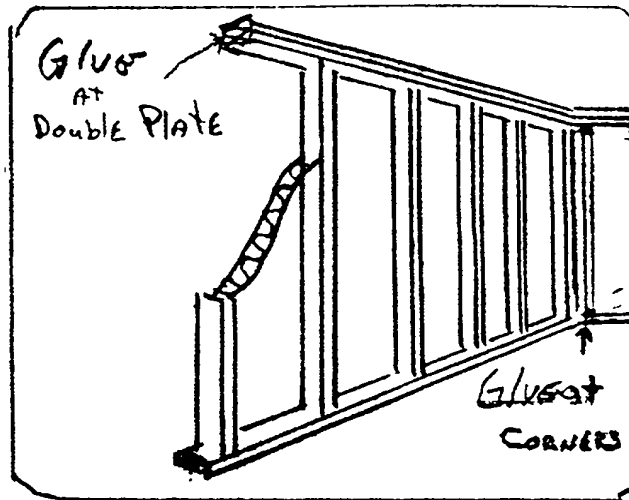
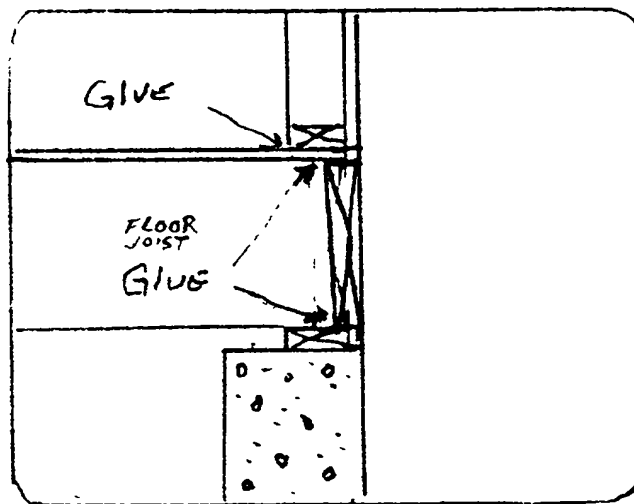


Fig 2



Attorney's Docket No. AIN 1732

DECLARATION AND POWER OF ATTORNEY**REGULAR OR DESIGN APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

AIR INFILTRATION PREVENTION IN BUILDINGS

the specification of which:

(check one)

☒ is attached hereto

☐ was filed on _____ as Application Serial No.

_____, and was amended on _____.

☐ was described and claimed in PCT International Application No. _____, filed on _____ and as amended under PCT Article 19 on _____, if any.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a) - (d) or §365(b) of any foreign application for patent or inventor's certificate, or §365(a) of any PCT application which designates at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Priority Claimed

_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)

Priority Not Claimed

ANY FOREIGN APPLICATION(S), ON THE SAME SUBJECT MATTER WHICH HAS A FILING DATE EARLIER THAN THE EARLIEST APPLICATION FROM WHICH PRIORITY IS CLAIMED

_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)
-------------------	--------------------	---------------------------------

CLAIM FOR BENEFIT OF PROVISIONAL APPLICATION(S)

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

<u>60/048,548</u> (Application Number)	<u>June 4, 1997</u> (Filing Date)
_____ (Application Number)	_____ (Filing Date)

CLAIM FOR BENEFIT OF EARLIER U.S. APPLICATION(S) UNDER 35 U.S.C. 120

(complete this part only if this is a divisional,
continuation or CIP application)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

_____ (Serial No.)	_____ (Filing Date)	_____ (Status: patented, pending, abandoned)
_____ (Serial No.)	_____ (Filing Date)	_____ (Status: patented, pending, abandoned)

POWER OF ATTORNEY

I hereby appoint the following attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Irving Powers (15,700), Donald G. Leavitt (17,626), John K. Roedel, Jr. (25,914), Michael E. Godar (28,416), Edward J. Hejlek (31,525), William E. Lahey (26,757), Richard G. Heywood (18,224), Frank R. Agovino (27,416), Kurt F. James (33,716), G. Harley Blosser (33,650), Paul I. J. Fleischut (35,513), Vincent M. Keil (36,838), Robert M. Evans, Jr. (36,794), Robert M. Bain (36,736), Joseph A. Schaper (30,493), Kathleen M. Petrillo (35,076), Rudolph A. Telscher, Jr. (36,032), Paul A. Stone (38,628), David E. Crawford, Jr. (38,118), Paul A. Maddock (37,877), Charles E. Cohen (34,565), Scott A. Williams (39,876), Richard L. Bridge (40,529), David M. Gryte (P-41,809), and Christopher M. Goff (P-41,785).

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Lawrence L. Staples

Inventor's signature Lawrence L. Staples Date 6-3-98
Residence Bridgeton, Missouri Citizenship USA
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Full name of second joint inventor Timothy O'Neil

Second inventor's signature X Timothy D. O'Neil Date 6-3-98
Residence Olivette, Missouri Citizenship USA
Post Office address 1137 Collingwood Olivette Mo. 63132

Applicant or Patentee: Lawrence L. Staples et al. Attorney's
 Serial or Patent No.: _____ Docket No.: AIN 1732

Filed or Issued: _____

For: AIR INFILTRATION PREVENTION IN BUILDINGS

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
 STATUS (37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am

[] the owner of the small business concern identified below:
 [XXX] an official of the small business concern empowered to act
 on behalf of the concern identified below:

NAME OF CONCERN Aladdin Insulation & Roofing, Inc.

ADDRESS OF CONCERN 5924 Hancock Ave.

Berkeley, Missouri 63143

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled AIR INFILTRATION PREVENTION IN BUILDINGS by inventors Lawrence L. Staples and Timothy O'Neil described in

[XXX] the specification filed herewith
 [] Application Serial No. _____, filed _____.
 [] Patent No. _____, issued _____.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by an person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a

small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

*NOTE: Separate verified statements are required for each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING _____ Lawrence L. Staples

TITLE OF PERSON OTHER THAN OWNER _____ President

ADDRESS OF PERSON SIGNING _____ Aladdin Insulation & Roofing, Inc.

_____ Berkeley, Missouri 63143

SIGNATURE _____ DATE 6-3-98

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